



UNITED STATES PATENT AND TRADEMARK OFFICE

A
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,953	06/09/2004	Min-Lung Huang	10546-US-PA	3952
31561	7590	03/13/2006	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN			WILLIAMS, ALEXANDER O	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/709,953

Applicant(s)

HUANG ET AL.

Examiner

Alexander O. Williams

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 4 to 7 and 13 to 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-12 and 16-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2826

Serial Number: 10/709953 Attorney's Docket #: 10546-US-PA
Filing Date: 6/9/2004; claimed foreign priority to 6/9/2003

Applicant: Huang et al.

Examiner: Alexander Williams

Applicant's Amendment filed 12/22/05 to the election of the species of figure 2 (claims 1 to 3, 8 to 12 and 16 to 20), filed 7/29/05, has been acknowledged.

This application contains claims 4 to 7 and 13 to 15 drawn to an invention non-elected without traverse.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2826

Initially, it is noted that the 35 U.S.C. § 103 rejection based on a first passivation layer 106 and a second passivation layer 108 deals with an issue (i.e., the integration of multiple pieces into one piece or conversely, using multiple pieces in replacing a single piece) that has been previously decided by the courts.

In Howard v. Detroit Stove Works 150 U.S. 164 (1893), the Court held, "it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together...."

In In re Larson 144 USPQ 347 (CCPA 1965), the term "integral" did not define over a multi-piece structure secured as a single unit. More importantly, the court went further and stated, "we are inclined to agree with the solicitor that the use of a one-piece construction instead of the [multi-piece] structure disclosed in Tuttle et al. would be merely a matter of obvious engineering choice" (bracketed material added). The court cited In re Fridolph for support.

In re Fridolph 135 USPQ 319 (CCPA 1962) deals with submitted affidavits relating to this issue. The underlying issue in In re Fridolph was related to the end result of making a multi-piece structure into a one-piece structure. Generally, favorable patentable weight was accorded if the one-piece structure yielded results not expected from the modification of the two-piece structure into a single piece structure.

Claims 1 to 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hashimoto (U.S. Patent # 6,583,516 B2).

1. Hashimoto (figures 1 to 17) specifically figure 10c show a chip packaging structure, comprising: a chip having a first passivation layer **106,108** and at least a bonding pad **104**, wherein the bonding pad is exposed by the first passivation layer and the first passivation layer has at least a recess; a redistribution layer **110** formed over the first passivation layer, wherein the redistribution layer electrically connects with the bonding

Art Unit: 2826

pad and extends from the bonding pad to the recess; a second passivation layer **116** formed over the first passivation layer and the redistribution layer, wherein the second passivation layer has an opening **108a** that exposes the redistribution layer above the recess; and at least a bump **114** disposed inside the opening and electrically connected to the redistribution layer above the recess.

2. The chip packaging structure of claim 1, Hashimoto show wherein an obtuse angle is formed between a sidewall of the recess and a bottom surface; of the recess.

3. The chip packaging structure of claim 1, Hashimoto further comprising at least an under-bump-metallurgy layer **112** between the redistribution layer that is exposed by the opening and the bump.

Therefore, it would have been obvious to one of ordinary skill in the art to use the first passivation layer 106 and the second passivation layer 108 as "merely a matter of obvious engineering choice" as set forth in the above case law.

Claims 1 to 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Elenius et al. (U.S. Patent # 6,287,893 B1).

1. Elenius et al. (figures 1 and 2) show a chip packaging structure, comprising: a chip having a first passivation layer **22,24** and at least a bonding pad **18**, wherein the bonding pad is exposed by the first passivation layer and the first passivation layer has at least a recess; a redistribution layer **32** formed over the first passivation layer, wherein the redistribution layer electrically connects with the bonding pad and extends from the bonding pad to the recess; a second passivation layer **33** formed over the first passivation layer and the redistribution layer, wherein the second passivation layer has an opening **26** that exposes the redistribution layer above the recess; and at least a bump **28** disposed inside the opening and electrically connected to the redistribution layer above the recess.

2. The chip packaging structure of claim 1, Elenius et al. show wherein an obtuse angle is formed between a sidewall of the recess and a bottom surface; of the recess.

Art Unit: 2826

3. The chip packaging structure of claim 1, Elenius et al. further comprising at least an under-bump-metallurgy layer **30** between the redistribution layer that is exposed by the opening and the bump.

Therefore, it would have been obvious to one of ordinary skill in the art to use the first passivation layer 106 and the second passivation layer 108 as "merely a matter of obvious engineering choice" as set forth in the above case law.

Initially, it is noted that the 35 U.S.C. § 103 rejection based on a first metallic layer formed over the opening-exposed redistribution layer; a second metallic layer formed over the first metallic layer; and a third metallic layer formed over the second metallic layer deals with an issue (i.e., the integration of multiple pieces into one piece or conversely, using multiple pieces in replacing a single piece) that has been previously decided by the courts.

In Howard v. Detroit Stove Works 150 U.S. 164 (1893), the Court held, "it involves no invention to cast in one piece an article which has formerly been cast in two pieces and put together...."

In In re Larson 144 USPQ 347 (CCPA 1965), the term "integral" did not define over a multi-piece structure secured as a single unit. More importantly, the court went further and stated, "we are inclined to agree with the solicitor that the use of a one-piece construction instead of the [multi-piece] structure disclosed in Tuttle et al. would be merely a matter of obvious engineering choice" (bracketed material added). The court cited In re Fridolph for support.

In re Fridolph 135 USPQ 319 (CCPA 1962) deals with submitted affidavits relating to this issue. The underlying issue in In re Fridolph was related to the end result of making a multi-piece structure into a one-piece structure. Generally, favorable patentable weight was accorded if the one-piece

structure yielded results not expected from the modification of the two-piece structure into a single piece structure.

Claims 8 to 12 and 16 to 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hashimoto (U.S. Patent # 6,583,516 B2).

8. The chip structure of claim 3, Hashimoto show wherein the under bump-metallurgy layer further comprises; a first metallic layer **112** formed over the opening-exposed redistribution layer; a second metallic layer **112** formed over the first metallic layer; and a third metallic layer **112** formed over the second metallic layer (see column 6, lines 55-63).
9. The chip structure of claim 8, Hashimoto show wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, **titanium**, **titanium-tungsten alloy**, tantalum, tantalum nitride and chromium (see column 6, lines 55-63).
10. The chip structure of claim 8, Hashimoto show wherein a material constituting the second metallic layer is selected from the- group consisting of nickel-vanadium alloy and **copper-chromium alloy**.
11. The chip structure of claim 8, Hashimoto show wherein a material constituting the third metallic layer comprises **copper**.
12. The chip structure of claim 8, Hashimoto show wherein the under-bump-metallurgy layer further comprises at least an electroplated layer formed over the third metallic layer and the electroplated layer is selected from the group consisting of **an electroplated copper layer**, an electroplated nickel layer, an electroplated gold layer and combination thereof.
16. The chip structure of claim 1, Hashimoto show wherein the redistribution layer further comprises: a first metallic layer **112** formed over the first passivation layer; a second metallic layer **112** formed over the first metallic layer, and a third metallic layer **112** formed over the second metallic layer.

Art Unit: 2826

17. The chip structure of claim 16, Hashimoto show wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, **titanium**, **titanium-tungsten alloy**, tantalum, tantalum nitride and chromium.

18. The chip structure of claim 16, Hashimoto show wherein a material constituting the second metallic layer is selected from the group consisting of nickel-vanadium alloy and copper-chromium alloy.

19. The chip structure of claim 16, Hashimoto show wherein a material constituting the third metallic layer comprise: copper.

20. The chip structure of claim 1, Hashimoto show wherein an obtuse angle is formed between a sidewall of the opening and a bottom surface of the opening.

Therefore, it would have been obvious to one of ordinary skill in the art to use the first metallic layer formed over the opening-exposed redistribution layer; a second metallic layer formed over the first metallic layer; and a third metallic layer formed over the second metallic layer as "merely a matter of obvious engineering choice" as set forth in the above case law.

Claims 8 to 12 and 16 to 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Elenius et al. (U.S. Patent # 6,287,893 B1).

8. The chip structure of claim 3, Elenius et al. show wherein the under bump-metallurgy layer further comprises; a first metallic layer **30** formed over the opening-exposed redistribution layer; a second metallic layer **30** formed over the first metallic layer; and a third metallic layer **30** formed over the second metallic layer.

9. The chip structure of claim 8, Elenius et al. show wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, **titanium**, **titanium-tungsten alloy**, tantalum, tantalum nitride and chromium (see column 7, lines 7-60).

10. The chip structure of claim 8, Elenius et al. show wherein a material constituting the second metallic layer is selected from the- group consisting of nickel-vanadium alloy and **copper-chromium alloy**.
11. The chip structure of claim 8, Elenius et al. show wherein a material constituting the third metallic layer comprises **copper**.
12. The chip structure of claim 8, Elenius et al. show wherein the under-bump-metallurgy layer further comprises at least an electroplated layer formed over the third metallic layer and the electroplated layer is selected from the group consisting of an **electroplated copper layer**, an electroplated nickel layer, an electroplated gold layer and combination thereof.
16. The chip structure of claim 1, Elenius et al. show wherein the redistribution layer further comprises: a first metallic layer **30** formed over the first passivation layer; a second metallic layer **30** formed over the first metallic layer, and a third metallic layer **30** formed over the second metallic layer.
17. The chip structure of claim 16, Elenius et al. show wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, **titanium**, **titanium-tungsten alloy**, tantalum, tantalum nitride and chromium.
18. The chip structure of claim 16, Elenius et al. show wherein a material constituting the second metallic layer is selected from the group consisting of nickel-vanadium alloy and copper-chromium alloy.
19. The chip structure of claim 16, Elenius et al. show wherein a material constituting the third metallic layer comprise: copper.
20. The chip structure of claim 1, Elenius et al. show wherein an obtuse angle is formed between a sidewall of the opening and a bottom surface of the opening.

Therefore, it would have been obvious to one of ordinary skill in the art to use the first metallic layer formed over the opening-exposed redistribution layer; a second metallic layer formed over the first metallic layer; and a third metallic layer formed over the second metallic layer as "merely a

Art Unit: 2826

matter of obvious engineering choice" as set forth in the above case law.

Response

Applicant's arguments filed 12/22/05 have been fully considered, but are moot in view of the new grounds of rejections detailed above.

The listed references are cited as of interest to this application, but not applied at this time.

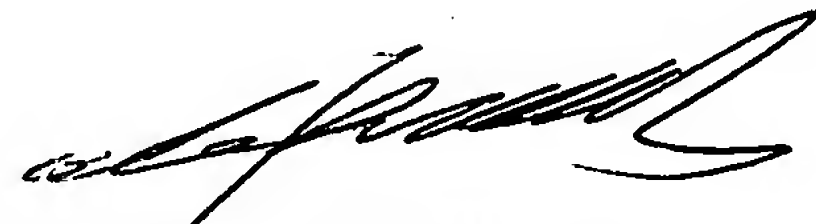
Field of Search	Date
U.S. Class and subclass: 257/737,734,738,700,701,758,781,782,783,773,774,772,7 79,780,761,763,764,765,766	9/15/05 3/4/06
Other Documentation: foreign patents and literature in 257/737,734,738,700,701,758,781,782,783,773,774,772,7 79,780,761,763,764,765,766	9/15/05 3/4/06
Electronic data base(s): U.S. Patents EAST	9/15/05 3/4/06

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander O. Williams whose telephone number is (571) 272 1924. The examiner can normally be reached on M-F 6:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272 1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alexander O Williams
Primary Examiner
Art Unit 2826

AOW
3/5/06